#PERFMATTERS 2020

MARC ILLIEN
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AVOCARD- RTBT.ONE - SIROOP - MILA AG - AXA - NAMICS

2006

Slimmest phone

Motorola SLVR L7

Best smart phone for business

BlackBerry 8700

Best slider phone

Samsung D900 (Ultra Edition 12.9)

Best camera phone

Sony Ericsson K800i

Most anticipated phone for 2007

Nokia N95

Sony Ericsson W810i

Phone closest being an "iPod Killer"

LG Chocolate KG800

Most innovative design

Sony Ericsson Z610i

Fashion phone - Lady look

Nokia E61

Best phone for e-mail that's not a BlackBerry

2007

cingular
11:38 AM
The New York Times - Breaking News...
http://nytimes.com/
The New York Times
Democrats Take Control of Congress

> 2008

2020

Close
google.com
Google
Kittens
cats

PERFORMANCE IS USEREXPERIENCE

USEREXPERIENC IS MONEY

AMAZON

EVERY 100MS
1% LESS ORDERS

GOOGLE

GOOD PAGE SPEED
BETTER SEARCH RESULT

~50% OF USERS EXPECT A PAGE LOAD FASTER THAN 2 SECONDS

~80% OF USERS EXPECT A FASTER PERFORMANCE ON MOBILE

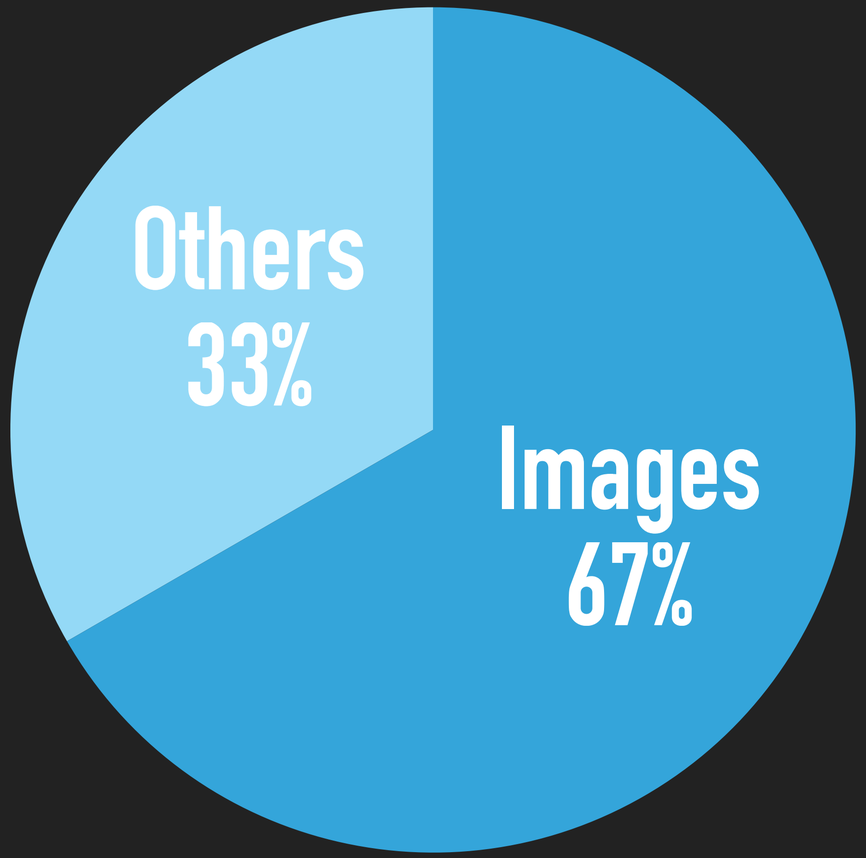
40% PEOPLE ABANDON IF LOAD IS > 3 SECS

SO WHY MY SITE IS SLOW?

MY WEBSITE SEEMS FAST FOR ME, SO IT SHOULD LOAD FAST FOR MY USERS.

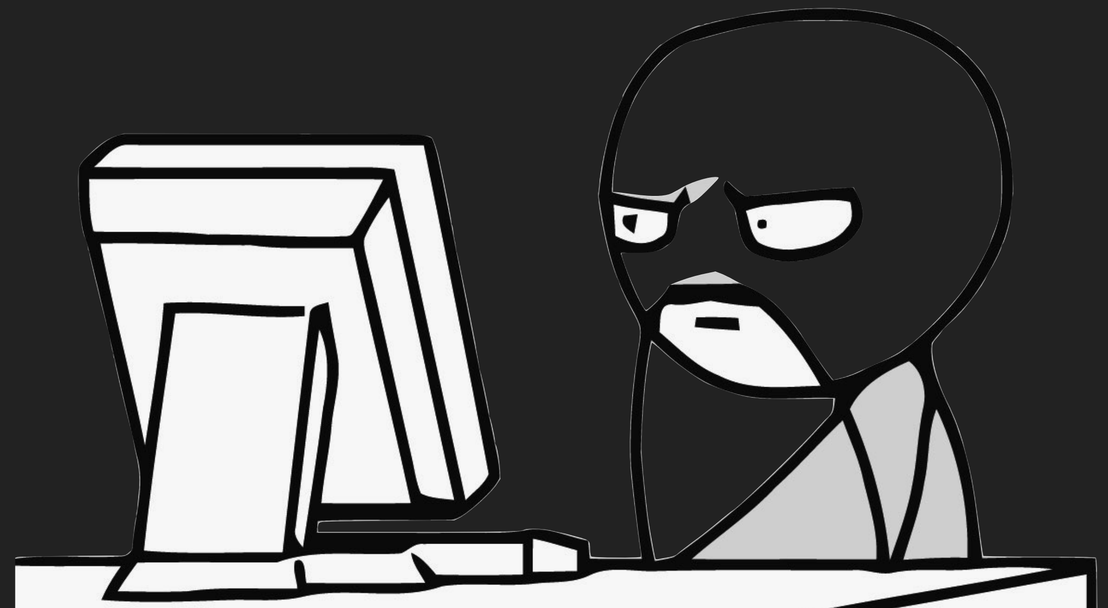
REMEMBER THE MOMENTS YOU ARE ON 3G? HOLIDAYS? BAD CONNECTIONS?

IMAGES



WEBM PNG PNG 8 / 24 SVG

JPG GIF



JPEG

ALWAYS FOR PHOTOS!

LOSSY!

NO TRANSPARENCY

HIGH COMPRESSION

222KB 2048PX

DIMENSIONS

59KB 1024PX

QUALITY / COMPRESSION

JPEG

Best

q=100 275KB

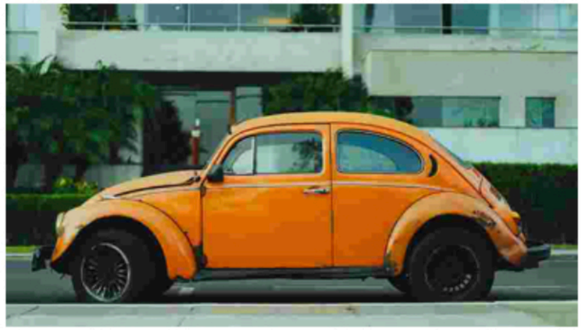
Good

q=75 56KB

Low

q=50 25KB

Lowest



q=10 19KB

800x600 resized source from https://unsplash.com/?photo=N7RiDzfF2iw by Dan Gold

CREDITS: HTTPS://IMAGES.GUIDE

PROGRESSIVE JPEGS

Progressive JPEG - Loads from low-quality to high-quality

OPTIMIZE YOUR IMAGES!

1. DIMENSION (WIDTH & HEIGHT)
2. COMPRESSION (QUALITY DETAIL LEVEL)
3. MANUAL IMPROVEMENTS: CROP, BLUR, HUE

CHOOSE THE RIGHT FORMAT

GIF

+ LOSSLESS

+ LOOPS

+ ANIMATION (SEQUENCES)

PNG 8

+ LOSSLESS

+ LESS COLORS

+ NO TRANSPARENCY

+ VERY SMALL FILE SIZE

PNG24 VS PNG8

PNG 24 - 47KB

2.1%

PNG 8 - 14kb

2.1%

PNG 24

LOSSLESS

NO COLOR LIMIT

FOR SPECIAL CASES LIKE TRANSPARENCY ONLY

—> HUUUGE ! NEVER USE FOR PHOTOS <—

JPG 129KB

PNG 240KB

WEBP

+ LOSSLESS

+ VERY GOOD COMPRESSION

+ TRANSPARENCY

+ ANIMATIONS

CHROME, OPERA & ANDROID, MICROSOFT EDGE 18+

LIMITED SAFARI (OSX BIG SUR ONLY)

USE WEBP IF YOU CAN

SVG

+ ONLY VECTORS

+ SHARP

+ NO REQUEST

BIGGER HTML

- MAINTAINABILITY

SVG


```
<?xml version="1.0" standalone="no"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 20010904//EN"
 "http://www.w3.org/TR/2001/REC-SVG-20010904/DTD/svg10.dtd">
<svg version="1.0" xmlns="http://www.w3.org/2000/svg"
 width="420.000000pt" height="420.000000pt" viewBox="0 0 420.000000 420.000000"
 preserveAspectRatio="xMidYMid meet">
<g transform="translate(0.000000,420.000000) scale(0.100000,-0.100000)"
fill="#000000" stroke="none">
<path d="M3426 2678 c-15 -29 -51 -96 -78 -148 -28 -52 -59 -108 -68 -125 -10
-16 -37 -66 -60 -110 -23 -44 -58 -109 -78 -145 -19 -36 -53 -99 -75 -140 -22
-41 -51 -95 -65 -120 -14 -25 -41 -74 -60 -110 -73 -137 -127 -238 -168 -312
l-43 -78 73 0 72 0 23 43 c13 23 42 78 66 122 23 44 54 100 67 125 14 25 65
119 113 210 48 91 95 179 105 195 29 49 114 207 200 370 29 55 61 114 70 130
10 17 31 56 48 88 l30 57 -71 0 -72 0 -29 -52z"/>
<path d="M670 2696 c-184 -34 -280 -147 -280 -328 l0 -68 114 0 115 0 6 58
c11 96 16 112 47 148 29 32 33 34 97 34 57 0 71 -3 88 -22 36 -40 43 -65 43
-157 0 -138 -11 -157 -199 -341 -195 -192 -261 -284 -295 -417 -9 -34 -16 -84
-16 -112 l0 -51 385 0 385 0 0 95 0 95 -240 0 c-204 0 -240 2 -240 15 0 37 54
103 214 260 159 155 177 177 212 250 38 79 38 81 38 200 0 107 -2 125 -24 170
-29 59 -82 114 -133 138 -42 20 -173 48 -220 46 -18 -1 -61 -7 -97 -13z"/>
<path d="M1902 2668 c-31 -99 -116 -157 -244 -166 l-68 -5 0 -78 0 -79 125 0
125 0 0 -450 0 -450 125 0 125 0 0 635 0 635 -88 0 -87 0 -13 -42z"/>
<path d="M2705 2696 c-106 -27 -145 -66 -171 -174 -17 -73 -17 -241 0 -314 21
-86 48 -123 113 -153 50 -24 65 -26 152 -23 188 6 237 66 248 296 10 217 -36
332 -146 362 -64 17 -145 20 -196 6z m127 -130 c10 -7 22 -25 28 -40 13 -35
13 -269 0 -317 -18 -64 -94 -79 -134 -26 -19 26 -21 42 -21 187 0 154 1 159
24 184 27 29 74 34 103 12z"/>
<path d="M3454 2081 c-82 -21 -126 -70 -153 -172 -16 -57 -10 -295 8 -352 31
-98 117 -142 265 -135 111 4 170 34 206 103 23 45 25 62 28 202 5 213 -21 293
-112 339 -36 18 -194 28 -242 15z m130 -122 c40 -19 49 -57 48 -216 0 -128 -2
-149 -19 -172 -15 -19 -30 -27 -61 -29 -38 -3 -43 0 -62 30 -17 29 -20 50 -20
```

CHOOSE THE RIGHT FORMAT

PNG 85KB

SVG 6KB

NOSTALGIA SPRITES

+ COMBINE IMAGES

+ LESS REQUESTS

GOOD FOR ICONS

- ONLY CSS

- HARD TO MAINTAIN

OLDSCHOOL GOOGLE SPRITE

```
.icons {
   background: url(image.jpg) 0 0;
}

.icon-1 {
  width: 100px; // icon width
  height: 100px; // icon height
  background-position: 50px 0px;
}

<div class="icons icon-1"></div>
```

SVG SPRITES

```
<svg class="a-svg-icon a-svg-icon--stroked a-svg-icon--large">
    <use xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="#headset">

    </use>
</svg>
```

```
<div hidden>
<svg xmlns="http://www.w3.org/2000/svg" style="display:none">
    <symbol id="account" viewBox="0 0 1024 1024">
    <circle cx="512.3" cy="328" r="215.7"/>
    <path d="M880.8 912.3h-737c0-203.5 165-368.5 368.5-368.5s368.5 165 368.5 368.5z"/>
    </symbol>

    <symbol id="logged" viewBox="0 0 1024 1024">
    <circle cx="408" cy="364.4" r="173"/>
    <path d="M424.7 833H112.5c0-163.3 132.3-295.6 295.5-295.6 64.6 0 124.3 20.7 173 56"/>
```

AND TOOLS?

LET IT DO FOR YOU

IMGIX.COM OR KRAKEN.IO

COMPRESSION, CROPPING, FACE DETECTION AND MORE

File Uploader allows you to upload images directly from your computer or import them from your favourite Cloud Storage.

1. Select source of images

FILE UPLOADER | URL PASTER | PAGE CRUNCHER

2. Select optimization mode

LOSSY | LOSSLESS | EXPERT

Image Quality Settings:

JPEG Quality (1-100):

PNG Quality (1-100):

Preserve Metadata:

- Select all
- Profile
- Date
- Copyright
- Geotag
- Orientation

Automatic Image Orientation:

- Auto-Orient Images

Chroma Subsampling:

- 4:2:0
- 4:2:2
- 4:4:4

3. Resize your images (optional)

Strategy: Don't Resize Width: px Height: px

Click to upload or drag-and-drop individual images here

Upload a ZIP Containing Your Images | Import from Dropbox | Import from Google Drive | Import from Box

File name	Original size	Kraked size	Savings	% Savings	Status
banner1.jpg	327.59 KB	293.98 KB	33.61 KB	10.26 %	Download File
banner2.jpg	804.07 KB	728.34 KB	75.73 KB	9.42 %	Download File
SUMMARY	1.11 MB	1022.32 KB	109.34 KB	9.66 %	

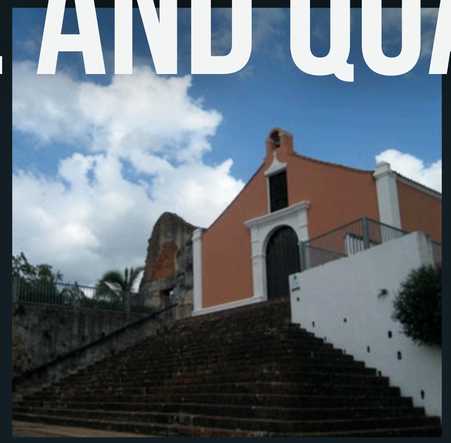
Share your results:

Share on Twitter | Share on Facebook

Save All Kraked Files in your Dropbox

Download All Kraked Files in a ZIP archive

REQUEST THE SIZE AND QUALITY ON DEMAND



Add New Operation

w	?	=	320
h	?	=	320
fit	?	=	crop
auto	?	=	false

```
https://assets.imgix.net/enhance-examples/example-001.jpg?auto=false&fit=crop&h=320&w=320
```

Download Image | Open in New Sandbox

PNG IMAGEOPTIM.COM

OPTIMIZE ONE CLICK LOSSLESS YOU PNG IMAGES

GUETZLI (BY GOOGLE)

Guetzli

Source 982KB

q=100 945KB

Butteraugli 0.408840
SSIM 0.999998

q=90 687KB

Butteraugli 1.580555
SSIM 0.999710

q=85 542KB

Butteraugli 2.099600
SSIM 0.999508

CREDITS: HTTPS://IMAGES.GUIDE

GUETZLI

CREDITS: HTTPS://IMAGES.GUIDE

TRY GUETZLI WITH YOUR IMAGE

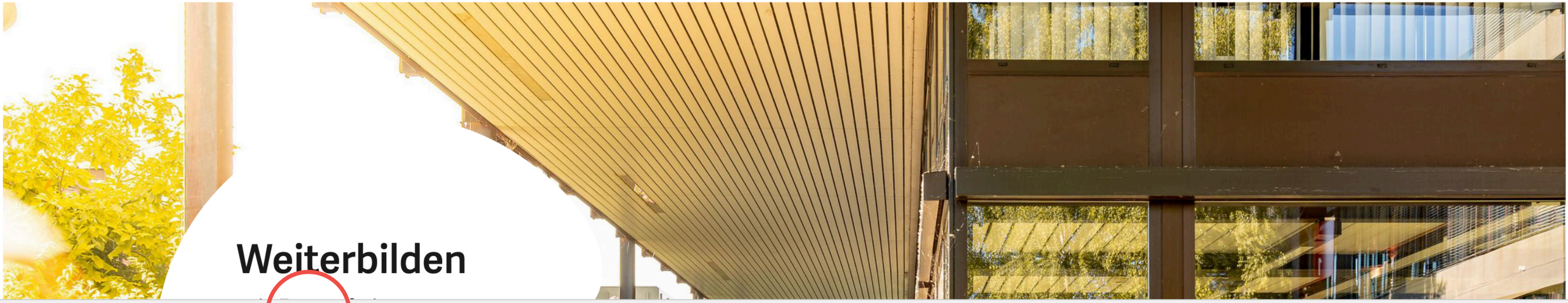
```
$ brew install guetzli
$ guetzli --quality 85 original.jpg output.jpg
```

OR HTTP://WWW.GUETZLI.IT/

CREDITS: HTTPS://IMAGES.GUIDE

HTTPS://IMAGES.GUIDE

LETS GET DIRTY!
LET'S ANALYSE



Elements Console Sources Network Performance Memory Application Security Lighthouse

Preserve log Disable cache Online

Filter Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other Has blocked cookies Blocked Requests

Use large request rows Group by frame

Show overview Capture screenshots

Name	Status	Type	Size	Time	Waterfall
olten_ausstellung_web.png	200	png	4.6 MB	1.55 s	
csm_campus-rj_unscharf_3_efc388ad41.jpg	200	jpeg	825 kB	1.45 s	
csm_dsc_1259-ed_931d520917.jpg	200	jpeg	[illegible]	[illegible]	
csm__56a7940_f8be338940.jpg	200	jpeg	[illegible]	[illegible]	
csm_rapperswil_a748596016.jpg	200	jpeg	145 kB	268 ms	
csm_st-gallen_1e4a7ba859.jpg	200	jpeg	139 kB	272 ms	
csm_ost-campus-buchs_dsc_1088_01_9ab13ccd8f.jpg	200	jpeg	128 kB	266 ms	
csm_florian_hauser_cybathlon_2020_eth_f2346ea927.jpg	200	jpeg	48.4 kB	122 ms	
csm_dinacon2020_labian_gashi_trophaee_f4cdc4a589.jpg	200	jpeg	30.0 kB	122 ms	
logo-de.svg	200	svg+xml	3.6 kB	28 ms	
logo-mobile.svg	200	svg+xml	1.1 kB	24 ms	
kidney-white.svg	200	svg+xml	492 B	116 ms	
search-lens.svg	200	svg+xml	425 B	239 ms	

825 kB transferred over network, resource size: 823 kB

DON’T USE PNG FOR PHOTOS ! NEVER!

DON’T WASTE PIXELS

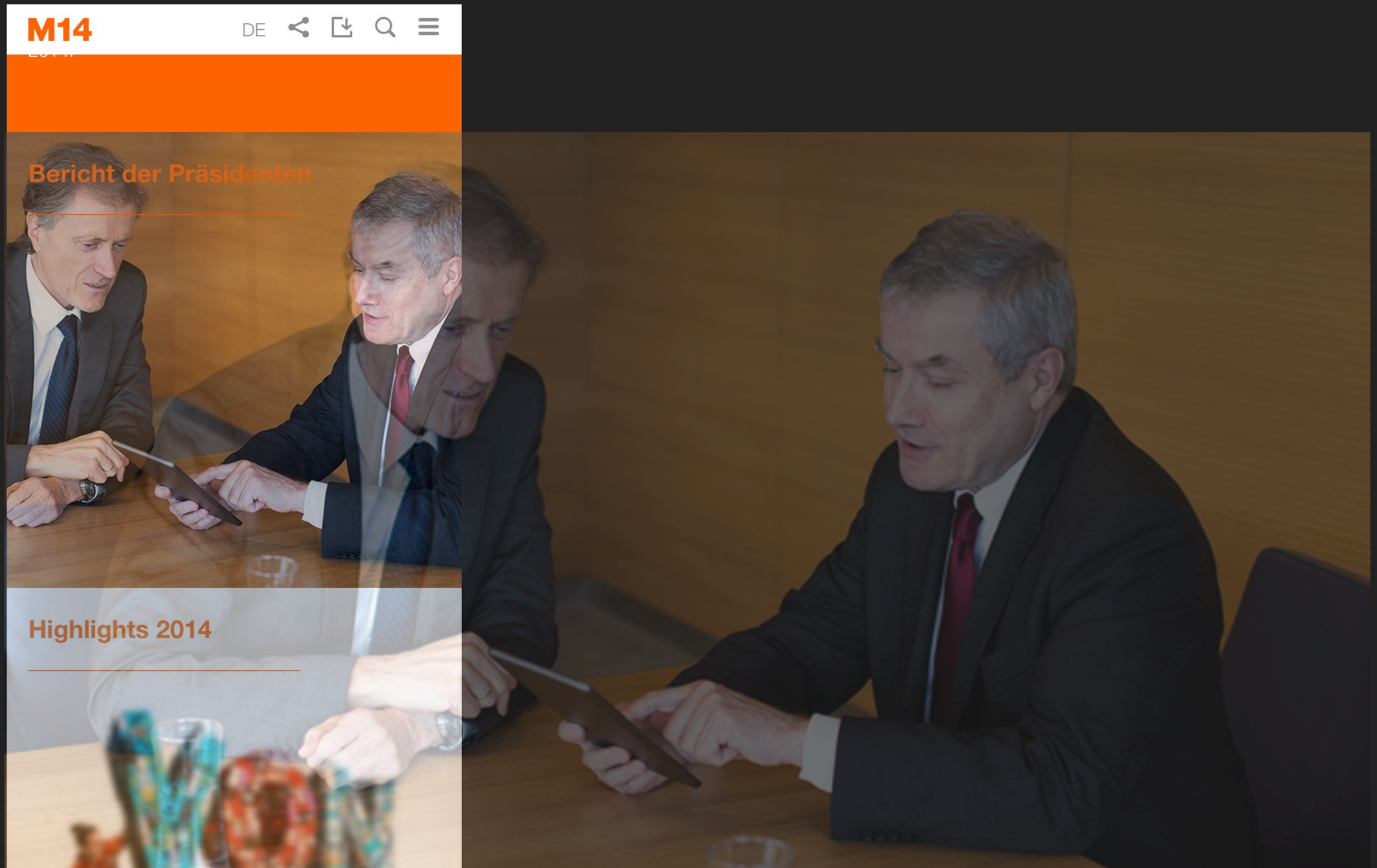
IMAGE SIZE BIGGER THAN THE DISPLAY SIZE... IS A WASTE OF PIXELS

Screen resolution	Natural size	Display size (CSS px)	Unnecessary pixels
1x	110 x 110	100 x 100	110 x 110 - 100 x 100 = 2100
1x	410 x 410	400 x 400	410 x 410 - 400 x 400 = 8100
1x	810 x 810	800 x 800	810 x 810 - 800 x 800 = 16100
2x	220 x 220	100 x 100	210 x 210 - (2 x 100) x (2 x 100) = 8400
2x	820 x 820	400 x 400	820 x 820 - (2 x 400) x (2 x 400) = 32400
2x	1620 x 1620	800 x 800	1620 x 1620 - (2 x 800) x (2 x 800) = 64400

TASK:

1. TRACK IMAGE SIZE ON YOUR PAGE
FIND HUGE IMAGES

WHY IS MY SITE STILL SO SLOW?


M14
DE
Bericht der Präsidenten
Highlights 2014

RESPONSIVE IMAGES!

RESPONSIVE IMAGES

SERVE DIFFERENT IMAGES PER VIEWPORT

MEDIAQUERIES

MOBILE FIRST

Bericht der Präsidenten

Trotz herausfordernden wirtschaftlichen Rahmenbedingungen erzielte die Migros-Gruppe 2015 einen Umsatz von CHF 27.4 Mrd., was einem Wachstum von 0.1% entspricht. Auch konnte sie leicht Marktanteile zulegen.

Andrea Broggini, Präsident der Verwaltung (rechts), Herbert Bolliger, Präsident der Generaldirektion (links)

CHF 27.4 Mrd.

Umsatz erwirtschaftete die Migros-Gruppe 2015, 0.1% mehr als im Vorjahr.

Migros ist 2015 insbesondere durch die Entwicklungen im wirtschaftlichen Umfeld gefordert

Bericht der Präsidenten

Trotz herausfordernden wirtschaftlichen Rahmenbedingungen erzielte die Migros-Gruppe 2015 einen Umsatz von CHF 27.4 Mrd., was einem Wachstum von 0.1% entspricht. Auch konnte sie leicht Marktanteile zulegen.

Andrea Broggini, Präsident der Verwaltung (rechts), Herbert Bolliger, Präsident der Generaldirektion (links)

Migros ist 2015 insbesondere durch die Entwicklungen im wirtschaftlichen Umfeld gefordert worden. Der überraschende Entscheid der Nationalbank, den **Euro-Mindestkurs** aufzuheben, sowie Unsicherheiten an den internationalen Finanz- und Wirtschaftsmärkten beeinflussten das Konsumverhalten negativ. Der Index der Konsumentenstimmung des Staatssekretariats für Wirtschaft (SECO) fiel bis Ende Jahr auf den tiefsten Wert seit 2011. Themen wie die Hochpreisinsel Schweiz, steigende Gesundheitskosten und die Angst um den Arbeitsplatz erhielten wieder höhere Relevanz.

CHF 27.4 Mrd.

BROWSERS ARE SMART

USE AN IMAGE SRCSET ATTRIBUTE!

```
<img
  src="http://placehold.it/200x200"
  srcset="
    http://placehold.it/50x50 50w,
    http://placehold.it/100x100 100w,
    http://placehold.it/200x200 200w,
    http://placehold.it/500x500 500w,
    http://placehold.it/1000x1000 1000w"
/>
```

Teaser List: Style 3

Frauenmod... M (45 Produkte)

Frauenmod...

Frauenmod... Frauenmode

Frauenmod... Frauenmod...

Frauenmod... Frauenmod...

Frauenmodemodemod... M (45 Produkte)

Frauenmode (45 Produkte) Frauenmode (4511000000 ... Frauenmode

Frauenmode (45 Produkte) Frauenmode (45 Produkte) Frauenmode (45 Produkte)

BROWSERS ARE SMART

```
<img
    src=“1024x768.jpg"
    srcset="
      320x240.jpg 320w,
      1024x768.jpg 1024w”

    sizes="
        (min-width: 1024px) 25vw,
        (min-width: 768px) 33.3vw"
/>
```

EASY IMPROVEMENTS

CONTENT & MOBILE FIRST & PROGRESSIVE ENHANCEMENT

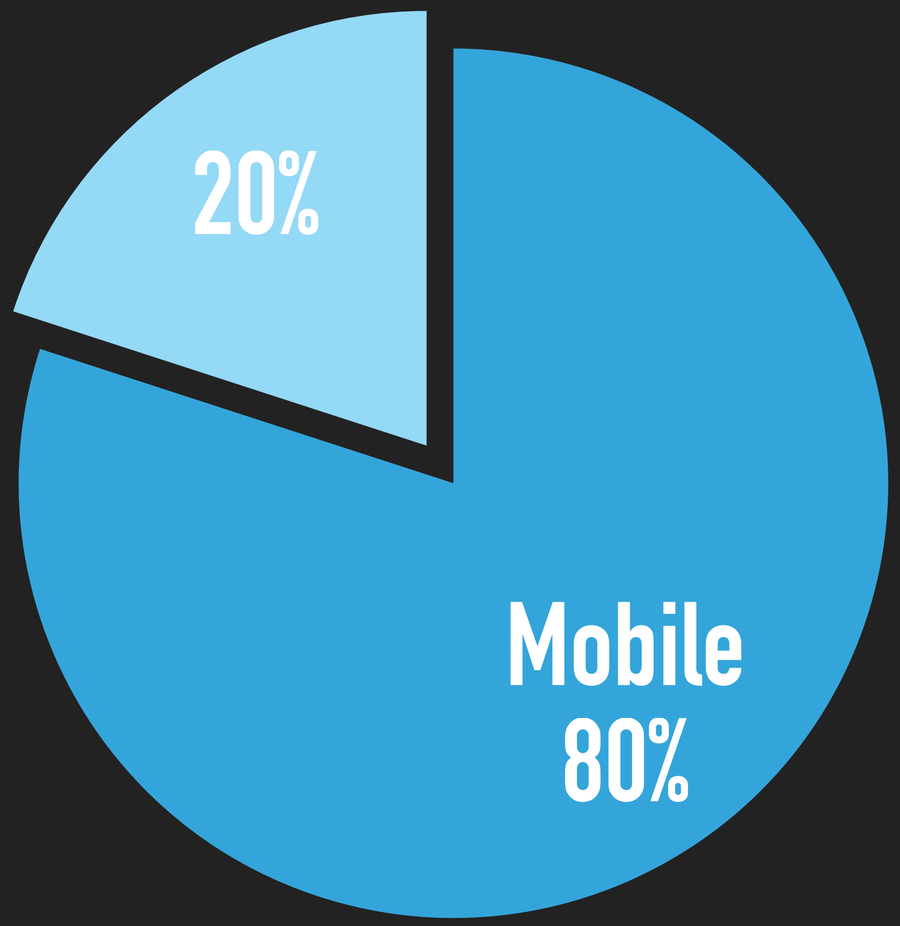
LOAD ONLY WHAT YOU NEED!

SMALL FIRST!

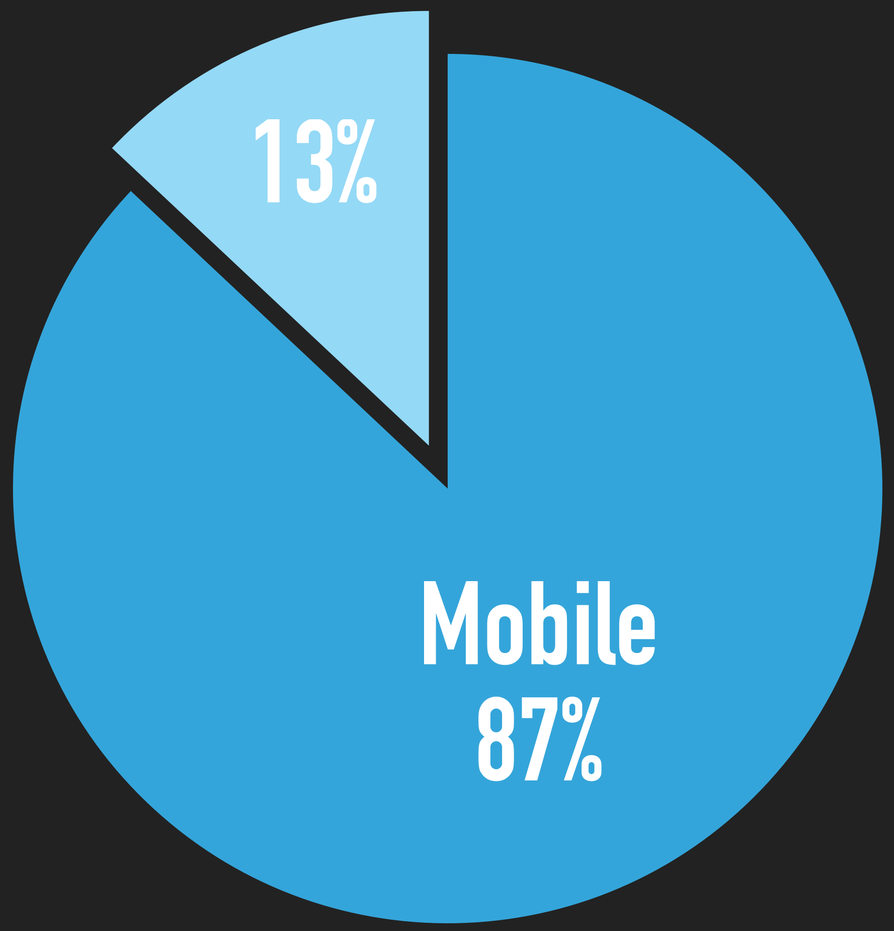
11:00AM 5K TRAINING

EXTRAS ON DEMAND

TWITTER



FACEBOOK



HOW TO GET THERE?

PERFORMANCE BUDGET!

BE SPECIFIC

100-MILLISECOND RESPONSE TIME, 60 FRAMES PER SECOND.

FID < 100MS, TIME TO INTERACTIVE < 5S ON 3G CONNECTION

CRITICAL FILE SIZE BUDGET < 200 KB

SET TARGETS

MOBILE INTERNET TRAFFIC WORLDWIDE

SEPT. 2020
~50% ~ 4 BILLION UNIQUE USERS

SEPT. 2010
~3%

https://www.statista.com/topics/779/mobile-internet/

HIGHEST INCREASE

START WITH ESSENTIALS

OPTIMIZE IMAGES

REMOVE BLOCKING JAVASCRIPT

```
<script src="script1.js"></script>
<script src="script2.js"></script>
</body>
```

BETTER NON BLOCKING JAVASCRIPT

```
<script src="script1.js" async></script>
<script src="script2.js" async></script>
</body>
```

LIKE ASYNC BUT RESPECTING THE ORDER

```
<script src="script1.js" defer></script>
<script src="script2.js" defer></script>
</body>
```

OPTIMIZE WEBFONTS

ADD INITIAL FALLBACK

ADD LOCAL() FALLBACK

REDUCE CHARSET (SUBSETTING)

LOAD WEBFONT LATER - NONBLOCKING

WEBFONT / Reduce charset (subsetting)

```
@font-face {
  font-family: 'Awesome Font';
  font-style: normal;
  font-weight: 400;
  src: local('Awesome Font'),
       url('/fonts/awesome-l.woff2') format('woff2'),
       url('/fonts/awesome-l.woff') format('woff'),
       url('/fonts/awesome-l.ttf') format('truetype'),
       url('/fonts/awesome-l.eot') format('embedded-opentype');
      unicode-range: U+000-5FF; /* Latin glyphs */
}
```

OPTIMIZE WEBFONTS

HTTPS://WWW.FONTSQUIRREL.COM/TOOLS/WEBFONT-GENERATOR

CAN YOU USE SYSTEM FONTS?

COMPUTERS HAVE NICE FONTS, THINK ABOUT.

"HELVETICA NEUE", "CALIBRI LIGHT", ROBOTO, SANS-SERIF;

HTTPS://WWW.FONTSQUIRREL.COM/TOOLS/WEBFONT-GENERATOR

WEB FONTS

HTTPS://GITHUB.COM/TYPEKIT/WEBFONTLOADER

LAZY LOADING

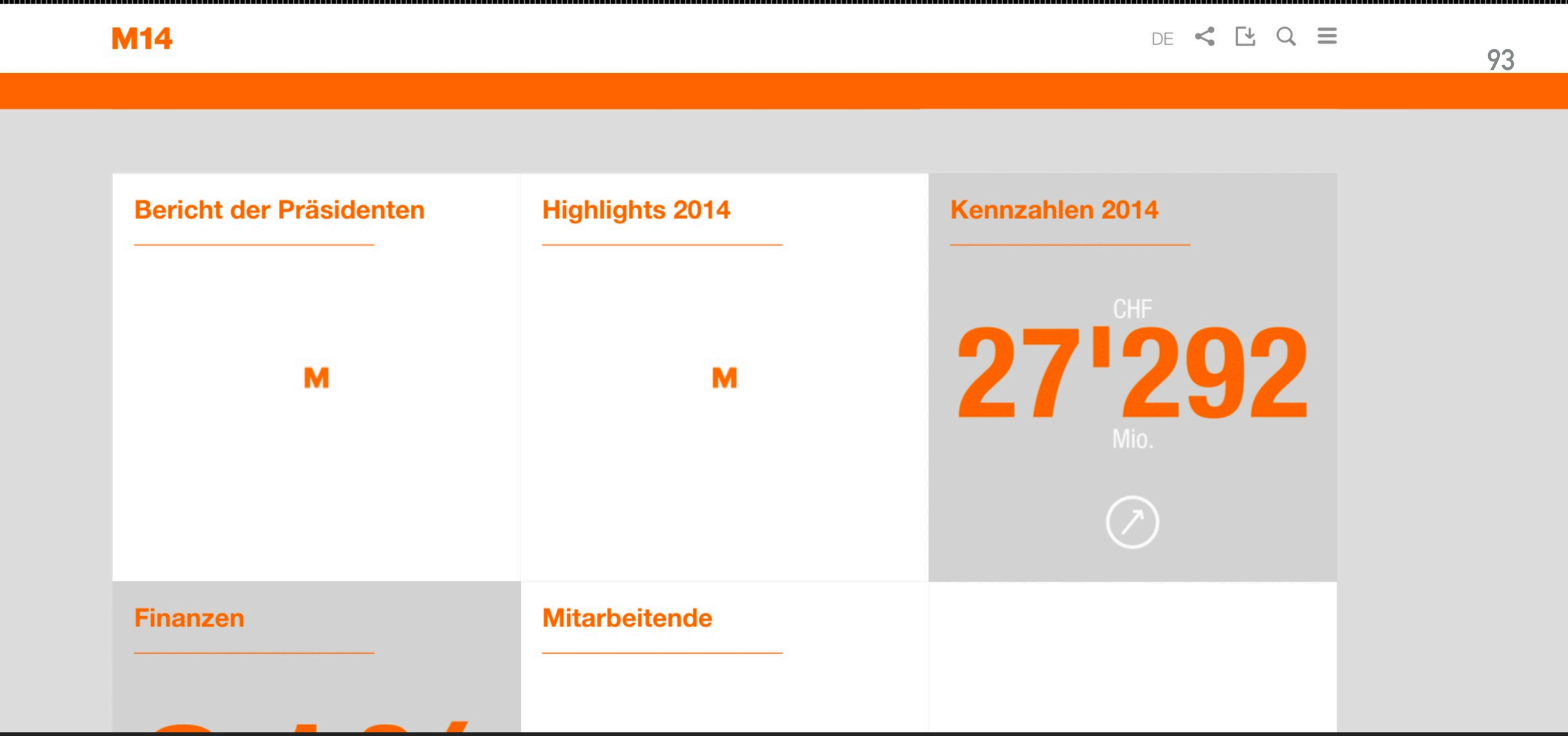
LOAD ONLY WHAT YOU SEE!

VISIBLE IMAGES

ON DEMAND

BIG IMPACT ON “ONE-PAGER” AND BIG LANDING PAGES

<img ~~src=“image.png”~~ data-original=“image.png”>


M14
DE
93
Bericht der Präsidenten
M
Highlights 2014
M
Kennzahlen 2014
CHF
27'292
Mio.
Finanzen
Mitarbeitende

1MB SAVED

TASK: TRY OUT LAZYLOAD

REACT: HTTPS://GITHUB.COM/TWOBIN/REACT-LAZYLOAD

VANILLA: HTTP://WWW.ANDREAVERLICCHI.EU/LAZYLOAD/

CSS OPTIMIZE

SELECTORS, CRITICAL CSS

ANIMATIONS, MINIFY, CONCATINATION

REPETITION: CSS SELECTORS

~~#page > .header .logo~~

.header__logo

~~button#btnBack~~

#btnBack

.btn-back (use class names!)

WRITE EFFICIENT CSS

HTTPS://DEVELOPER.MOZILLA.ORG/EN-US/DOCS/WEB/GUIDE/CSS/WRITING_EFFICIENT_CSS

LOAD ONLY WHAT YOU SEE!

Mehr als 150'000 Services durchgeführt

Alle Partner sind geprüft

mila empowering people

So funktioniert Mila | Sicherheit | Unsere Marken | Login

99

Lösen Sie Ihre technischen Herausforderungen noch heute

Buchen Sie jetzt qualifizierte und geprüfte Technik-Experten

Wählen Sie einen Service

z.B. Internet Installation, Smart TV Installation

Suchen

TRUSTED BY

amazon | ring | swisscom | AXA | SONOS

Unsere Services nach Kategorien

Alle | TV & Video | WLAN & Netzwerk | Computer | Allgemeine Hilfe | Smart Home | Mobiltelefon & Tablet | Audio & Heimkino | Haushaltsgeräte

z.B. Internet Installation, Smart TV Installation

Suchen

100

TRUSTED BY amazon ring swisscom AXA SONOS

Unsere Services nach Kategorien

Alle | TV & Video | WLAN & Netzwerk | Computer | Allgemeine Hilfe | Smart Home | Mobiltelefon & Tablet | Audio & Heimkino | Haushaltsgeräte

Smart TV einrichten

99 CHF *

Auswählen

Smart TV einrichten mit Sendersortierung

139 CHF *

Auswählen

Smart TV Fehlerbehebung

79 CHF *

Auswählen

WLAN Router einrichten

99 CHF *

Auswählen

Windows Computer einrichten

99 CHF *

Auswählen

Mehr Services anzeigen

1’500KB NOT NEEDED/VISIBLE CSS - BLOCKED PAGE LOAD

* Empfohlener, unverbindlicher Höchstpreis. Den effektiven Preis der Leistung legen Sie direkt mit Ihrem Mila Friend fest.

king.mila.com/de-ch/booking/tv-video/smart-tv-einrichten-mit-sendersortierung

80KB

Mehr als 150'000 Services durchgeführt

Alle Partner sind geprüft

mila empowering people

So funktioniert Mila

Sicherheit

Unsere Marken

Login

Lösen Sie Ihre technischen Herausforderungen noch heute

Buchen Sie jetzt qualifizierte und geprüfte Technik-Experten

Wählen Sie einen Service

z.B. Internet Installation, Smart TV Installation

Suchen

TRUSTED BY

amazon

ring

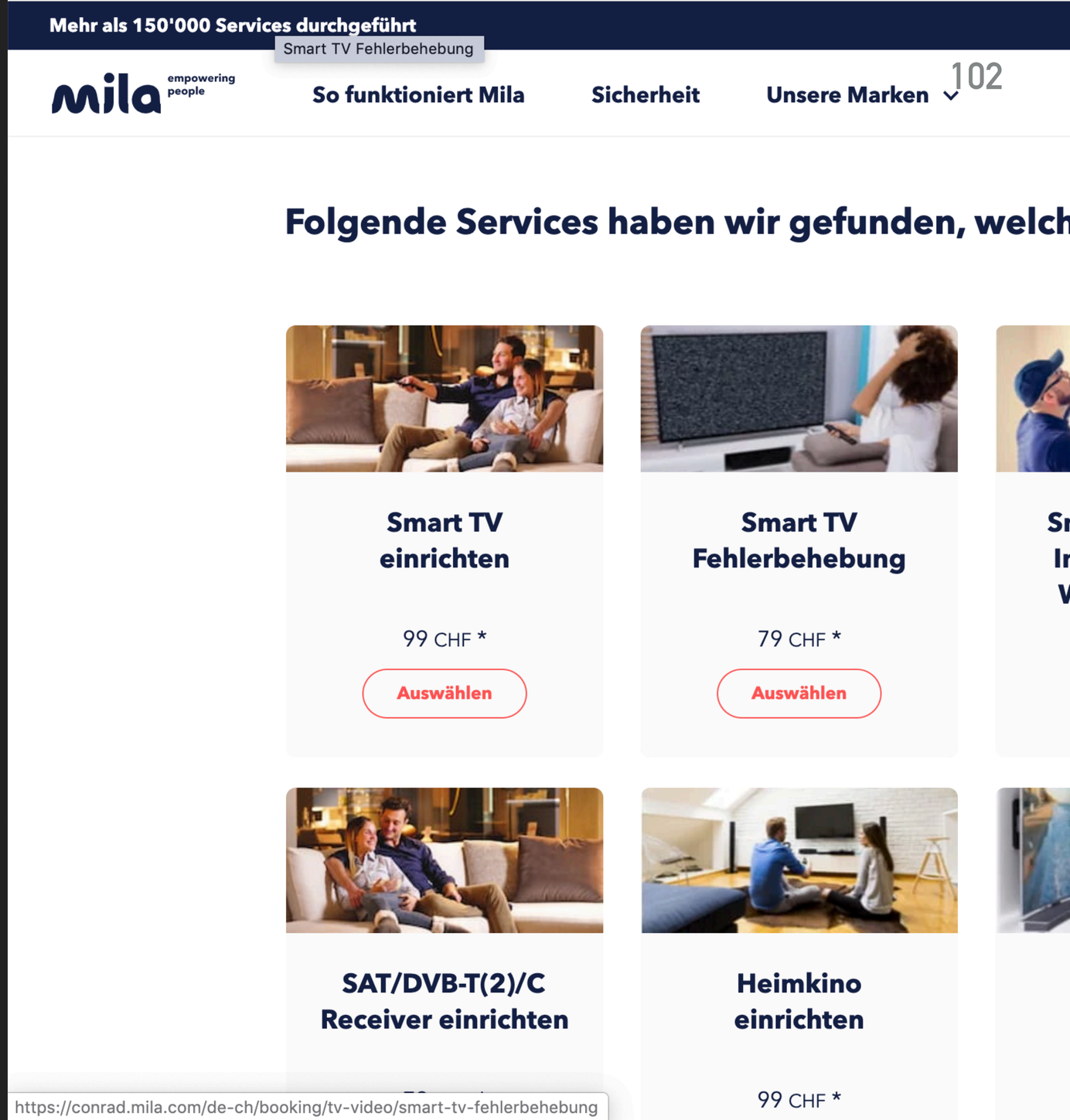
swisscom

AXA

SONOS

1200KB

GRIDS, FRAMEWORKS,
POLYFILLS,
OTHER PAGES
OLD PAGES, OLD CSS



CRITICAL CSS

+ IMPORTANT CSS (IN FOLD) ALREADY INLINE ON PAGE

HUGE IMPACT

- HARD TO MAINTAIN

HTTPS://GITHUB.COM/ADDYOSMANI/CRITICAL

HTTPS://WWW.SMASHINGMAGAZINE.COM/2015/08/UNDERSTANDING-CRITICAL-CSS/

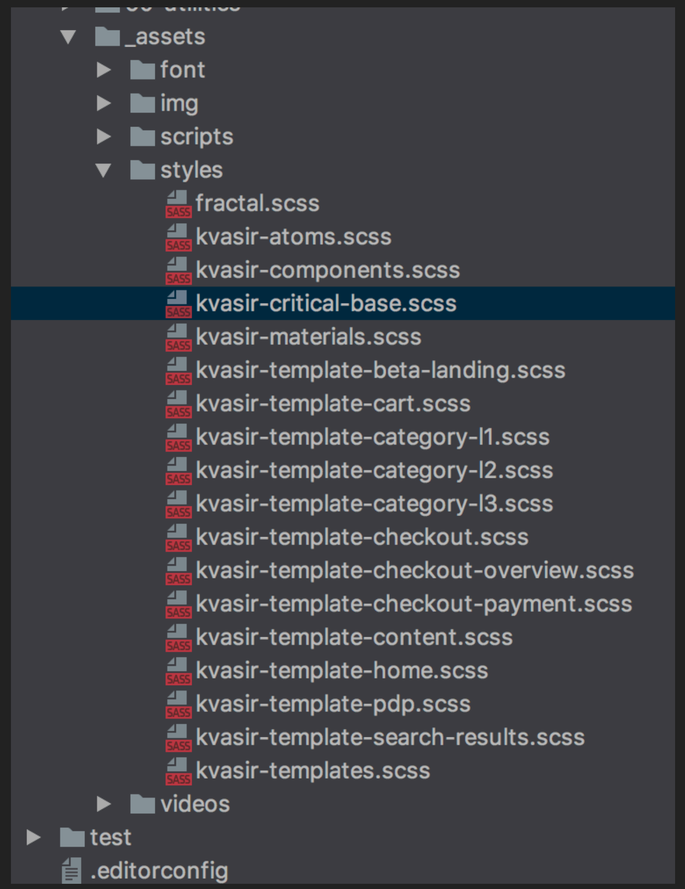
JS WORLD: PURE COMPONENTS

COMBINE EVERYTHING IN ONE PURE ISOLATED COMPONENT.

STYLES + COMPONENT.

```
<style type="text/css">html.kvasir{-webkit-box-sizing:border-box;box-sizing:border-box}*,.kvasir *,.kvasir ::after,.kvasir ::before,::after,::before
box;box-sizing:border-box}.kvasir,html.kvasir{font-size:100%;-webkit-tap-highlight-color:transparent;-ms-text-size-adjust:100%;-webkit-text-size-adjust:
smoothing:antialiased}body{font-family:sans-serif;letter-spacing:-.5px;font-weight:400;font-style:normal;line-height:24px;font-size:16px;font-size:1rem;
serif;color:#28363e;margin:0}.wf-active body{font-family:Roboto,sans-serif;letter-spacing:normal}figure{margin:0}a{text-decoration:none;color:#0d768c;-w
.2s;transition:color .2s;will-change:color;background:0 0;border:0;padding:0;margin:0;border-radius:0;cursor:pointer}a:focus,a:hover,a:hover i{color:#06
height:24px;font-size:16px;font-size:1rem;margin-bottom:20px}button{background:0 0;border:0}sub,sup{vertical-align:super;letter-spacing:normal;position:
.h2,.obj-editor h2{line-height:28px;font-size:20px;font-size:1.25rem;margin-bottom:10px}.obj-editor .h3,.obj-editor h3{line-height:24px;font-size:16px;f
bottom:8px}.obj-editor .h4,.obj-editor h4{line-height:20px;font-size:14px;font-size:.875rem;margin-bottom:6px}.obj-editor .h5,.obj-editor h5{line-height
size:.8125rem;margin-bottom:6px}.obj-editor .h6,.obj-editor h6,.obj-editor small{line-height:16px;font-size:12px;font-size:.75rem;margin-bottom:6px}.obj
height:24px;font-size:16px;font-size:1rem;margin-bottom:10px}fieldset,legend{border:0;margin:0;padding:0}button,input,select,textarea{font-family:sans-s
spacing:-.5px;font-weight:400;font-style:normal;line-height:24px;font-size:16px;font-size:1rem;border-radius:initial}.wf-active button,.wf-active input,
active textarea{font-family:Roboto,sans-serif;letter-
spacing:normal}input,select,textarea{margin:0}input[type=checkbox]+label::before,input[type=radio]+label::before{display:none}input[type=checkbox],input
{display:inline;border:0}input:-webkit-autofill,textarea:-webkit-autofill{-webkit-box-shadow:0 0 0 1000px #fff inset;box-shadow:0 0 0 1000px #fff inset}
clear,textarea::-ms-clear{display:none}input[readonly],textarea[readonly]{cursor:default}input[type=date],input[type=number]{-moz-appearance:textfield}i
inner-spin-button,input[type=date]::-webkit-outer-spin-button,input[type=number]::-webkit-inner-spin-button,input[type=number]::-webkit-outer-spin-butto
appearance:none}textarea{resize:vertical}input[autocomplete=off]::-webkit-contacts-auto-fill-button{visibility:hidden;display:none;pointer-
events:none;height:0;width:0;margin:0}.h1,h1{line-height:52px;font-size:40px;font-size:2.5rem;margin-bottom:0}@media (min-width:48em){.h1,h1{line-height
size:4.5rem}}.h2,h2{line-height:40px;font-size:32px;font-size:2rem;margin-bottom:0}@media (min-width:48em){.h2,h2{line-height:52px;font-size:40px;font-s
height:32px;font-size:24px;font-size:1.5rem;margin-bottom:0}@media (min-width:48em){.h3,h3{line-height:40px;font-size:32px;font-size:2rem}}.h4,h4{line-h
size:16px;font-size:1rem;margin-bottom:0}@media (min-width:48em){.h4,h4{line-height:32px;font-size:24px;font-size:1.5rem}}.h5,h5{line-height:20px;font-s
size:.875rem;margin-bottom:0}@media (min-width:48em){.h5,h5{line-height:24px;font-size:16px;font-size:1rem}}.h6,h6,small{line-height:16px;font-size:13px
bottom:0}@media (min-width:48em){.h6,h6,small{line-height:20px;font-size:14px;font-size:.875rem}}img{max-width:100%;font-style:italic;vertical-
align:middle;border:0}img[height],img[width]{max-width:none}.obj-banner--white{background-color:#fff}.obj-banner--grey{background-color:#eef3f7}.obj-ban
color:#e6fbff}.obj-page-border{padding-left:12px;padding-right:12px;margin:0 auto}@media (min-width:48em){.obj-page-border{padding-left:12px;padding-rig
width:64em){.obj-page-border{padding-left:5vw;padding-right:5vw}}.obj-border-small{padding:0 16px}@media (min-width:48em){.obj-border-small{padding:0 40
flag{display:table;width:100%}.obj-flag__image{display:table-cell;vertical-align:middle}.obj-flag__image>img{display:block;max-width:none}.obj-flag__bod
cell;vertical-align:middle;width:100%}.obj-form{margin-bottom:20px}.obj-form__title{font-family:sans-serif;letter-spacing:-.5px;font-weight:700;font-sty
height:32px;font-size:24px;font-size:1.5rem;margin-bottom:8px}.wf-active .obj-form__title{font-family:Roboto,sans-serif;letter-spacing:normal}@media (mi
form__title{margin-bottom:12px}}.obj-form__row{margin-bottom:16px}.obj-form__row::after,.obj-form__row::before{content:' ';display:table}.obj-form__row:
form__col{margin-bottom:16px}.obj-form__label--required::after{content:' *';color:#179bb5;font-size:1.2rem}.obj-form__fieldset{margin-top:24px}.obj-form
form__layout-6::before{content:' ';display:table}.obj-form__layout-6::after{clear:both}@media (min-width:48em){.obj-form__layout-6 .obj-form__col:first-
child{width:49.15254%;float:left;margin-left:0}.obj-form__layout-6 .obj-form__col{width:49.15254%;float:left;margin-left:1.69492%}}.obj-form__layout-9x3
9x3::before{content:' ';display:table}.obj-form__layout-9x3::after{clear:both}.obj-form__layout-9x3 .obj-form__col:first-child{width:74.57627%;float:lef
form__layout-9x3 .obj-form__col{width:23.72881%;float:left;margin-left:1.69492%}.obj-form__layout-3x9::after,.obj-form__layout-3x9::before{content:' ';d
form__layout-3x9::after{clear:both}.obj-form__layout-3x9 .obj-form__col:first-child{width:23.72881%;float:left;margin-left:0}.obj-form__layout-3x9 .obj-
form__col{width:74.57627%;float:left;margin-left:1.69492%}@media (min-width:48em){.obj-form__city,.obj-form__street{width:83.33333%;float:left}.obj-form
form__postal{width:16.66667%;float:left}}.obj-form__button-submit{font-family:sans-serif;letter-spacing:-.5px;font-weight:500;font-style:normal;line-hei
size:16px;font-size:1rem;display:inline-block;border-radius:2px;padding:9px;text-align:center;-webkit-transition:color .2s,background .2s;transition:col
.2s;cursor:pointer;margin:0;background-color:transparent;line-height:24px;font-size:16px;font-size:1rem;color:#fff;background-color:#179bb5;border:1px s
.obj-form__button-submit{font-family:Roboto,sans-serif;letter-spacing:normal}.parsley-errors-list{line-height:20px;font-size:14px;font-size:.875rem;marg
type:none;color:#bb1134}.parsley-errors-list>li:not(:empty){margin-top:8px}@media (min-width:0) and (max-width:48em){.obj-swipe{overflow-y:hidden;overfl
space:nowrap}.obj-swipe__item{width:70vw;display:inline-block}}.obj-table{display:table;width:100%}.obj-table__cell{display:table-cell;vertical-align:mi
min{width:1%}.obj-table__cell--max{width:100%}.obj-wrapper{margin:0 auto;margin-bottom:20px}.obj-wrapper--default,.obj-wrapper--small{max-width:660px}.o
width:768px}.obj-wrapper--large{max-width:1024px}.a-svg-icon{fill:currentColor;width:24px;height:24px;display:inline-block;vertical-align:middle;-webkit
```

CODE ORGANISATION / ARCHITECTURE




```
@import '../../01-settings/**/*';
@import '../../20-tools/**/*';
@import '../../30-generic/**/*';
@import '../../40-base/**/*';
@import '../../50-objects/**/*';

// Atom Mixins but no stylesheet classes needed for the components
@import '../../60-components/62-atoms/button-neutral/button-neutral';
@import '../../60-components/62-atoms/button-cta/button-cta';
@import '../../60-components/62-atoms/button-link/button-link';
@import '../../60-components/62-atoms/dot/dot';
@import '../../60-components/62-atoms/form-label/form-label';
@import '../../60-components/62-atoms/form-input/form-input';
@import '../../60-components/62-atoms/form-textarea/form-textarea';
@import '../../60-components/62-atoms/link/link';
@import '../../60-components/62-atoms/pill/pill';
@import '../../60-components/62-atoms/tooltip/tooltip';
@import '../../60-components/62-atoms/svg-icon/svg-icon';

// Components
@import '../../60-components/66-organisms/header/header';
@import '../../60-components/66-organisms/navigation-primary/navigation-primary';
@import '../../60-components/66-organisms/notification/notification';
@import '../../60-components/66-organisms/list/list';
@import '../../60-components/64-molecules/image-responsive/image-responsive';
@import '../../60-components/64-molecules/button-show-more/button-show-more';
@import '../../60-components/64-molecules/list-item/list-item';
@import '../../60-components/64-molecules/badge-internal/badge-internal';
@import '../../60-components/64-molecules/banner-meta/banner-meta';
@import '../../60-components/64-molecules/price/price';
@import '../../60-components/64-molecules/breadcrumb/breadcrumb';
@import '../../60-components/64-molecules/language-switcher/language-switcher';
@import '../../60-components/64-molecules/usp-banner/usp-banner';
@import '../../60-components/64-molecules/logo/logo';
@import '../../60-components/64-molecules/searchbar/searchbar';
```

CONCAT AND MINIFY

CONCAT: STICK MULTIPLE FILES TOGETHER LESS REQUESTS

MINIMIZE: LESS FILE SIZE

lter | Hide data URLs | All | XHR | JS | CSS | Img | Media | Font | D

ame

webfonts.css?ver=nnmph2

external.min.css?ver=nnmph2

default+de.css

default.css

/ 37 requests | 38.1 KB / 9.8 MB transferred | Finish: 1.76 s |...

× Headers Preview Respons

```
linear}.fade.in{opacity:1}.t
index:1070;display:block;vis
top:-3px;padding:5px 0}.tool
5px}.tooltip-inner{max-width
radius:4px}html{color:#000;b
rgin:0;padding:0}table{borde
style:normal;font-weight:400
weight:400}q:before,q:after{
bottom}input,textarea,select
stamp.cssreset{display:none}
transform:translate3d(0,0,0)
";display:table}.h-cf:after,
0);height:1px;margin:-1px;ov
vh.focusable:focus{clip:auto
```

Console | Search | Emulation | Rendering

HOW TO ANALYSE

WEBPAGETEST.ORG

Web Page Performance Test for

ost.ch

From: Frankfurt, Germany - EC2 - **Chrome** - **Cable**
18/11/2020, 01:59:19

D	F	A	A	A	C	X
Security score	First Byte Time	Keep-alive Enabled	Compress Transfer	Compress Images	Cache static content	Effective use of CDN

Summary | **Details** | **Performance Review** | **Content Breakdown** | **Domains** | **Screenshot** | **Image Analysis** | **Request Map**

Tester: i-0128b28b03079a5ba
First View only
Test runs: **3**
Re-run the test

View JSON result
Raw page data - Raw object data
Export HTTP Archive (.har)
View Test Log

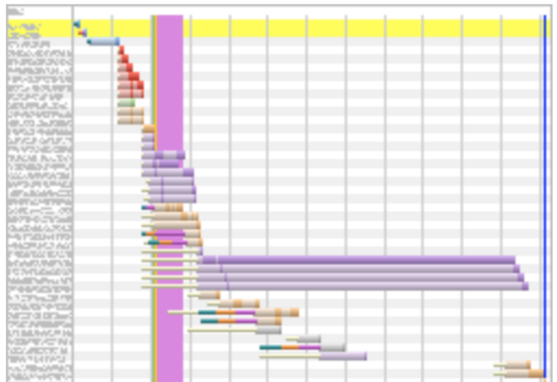
Performance Results (Median Run - SpeedIndex)

					Web Vitals		Document Complete			Fully Loaded			
	First Byte	Start Render	First Contentful Paint	Speed Index	Largest Contentful Paint	Cumulative Layout Shift	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View (Run 2)	1.053s	2.000s	2.031s	5.335s	3.015s	0.781	12.000s	44	6,187 KB	12.065s	46	6,191 KB	$$$$$

Plot Full Results

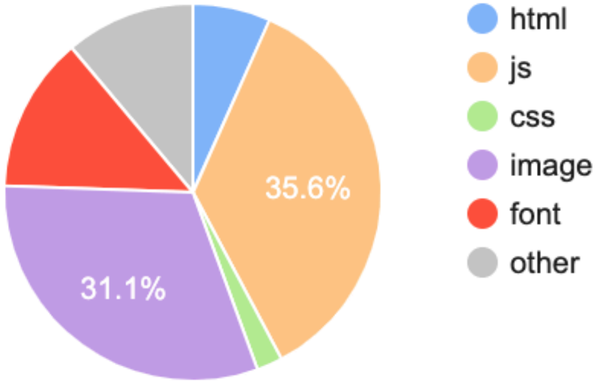
Test Results

Run 1:

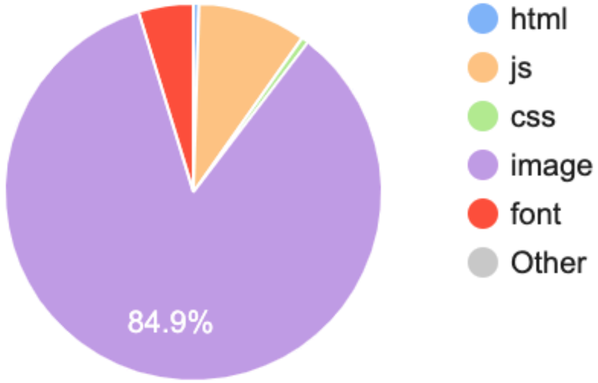
	Waterfall	Screenshot
First View (12.132s)		

wn

Requests



Bytes



85% IMAGES

Web Page Performance Test for

https://www.netflix.com/ch/

From: Frankfurt, Germany - EC2 - **Chrome** - **Cable**
18/11/2020, 02:05:39

B	F	A	A	A	F	X
Security score	First Byte Time	Keep-alive Enabled	Compress Transfer	Compress Images	Cache static content	Effective use of CDN

Tester: i-0128b28b03079a5ba
First View only
Test runs: **3**
Re-run the test

View JSON result
Raw page data - Raw object data
Export HTTP Archive (.har)
View Test Log

Performance Results (Median Run - SpeedIndex)

					Web Vitals		Document Complete			Fully Loaded			
	First Byte	Start Render	First Contentful Paint	Speed Index	Largest Contentful Paint	Cumulative Layout Shift	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View (Run 1)	0.875s	1.400s	1.431s	1.982s	3.865s	0	3.809s	33	1,713 KB	4.420s	34	1,730 KB	$$$$-

Plot Full Results

Test Results

Run 1:

	Waterfall	Screenshot	Video
First View (3.809s)			Filmstrip View - Watch Video

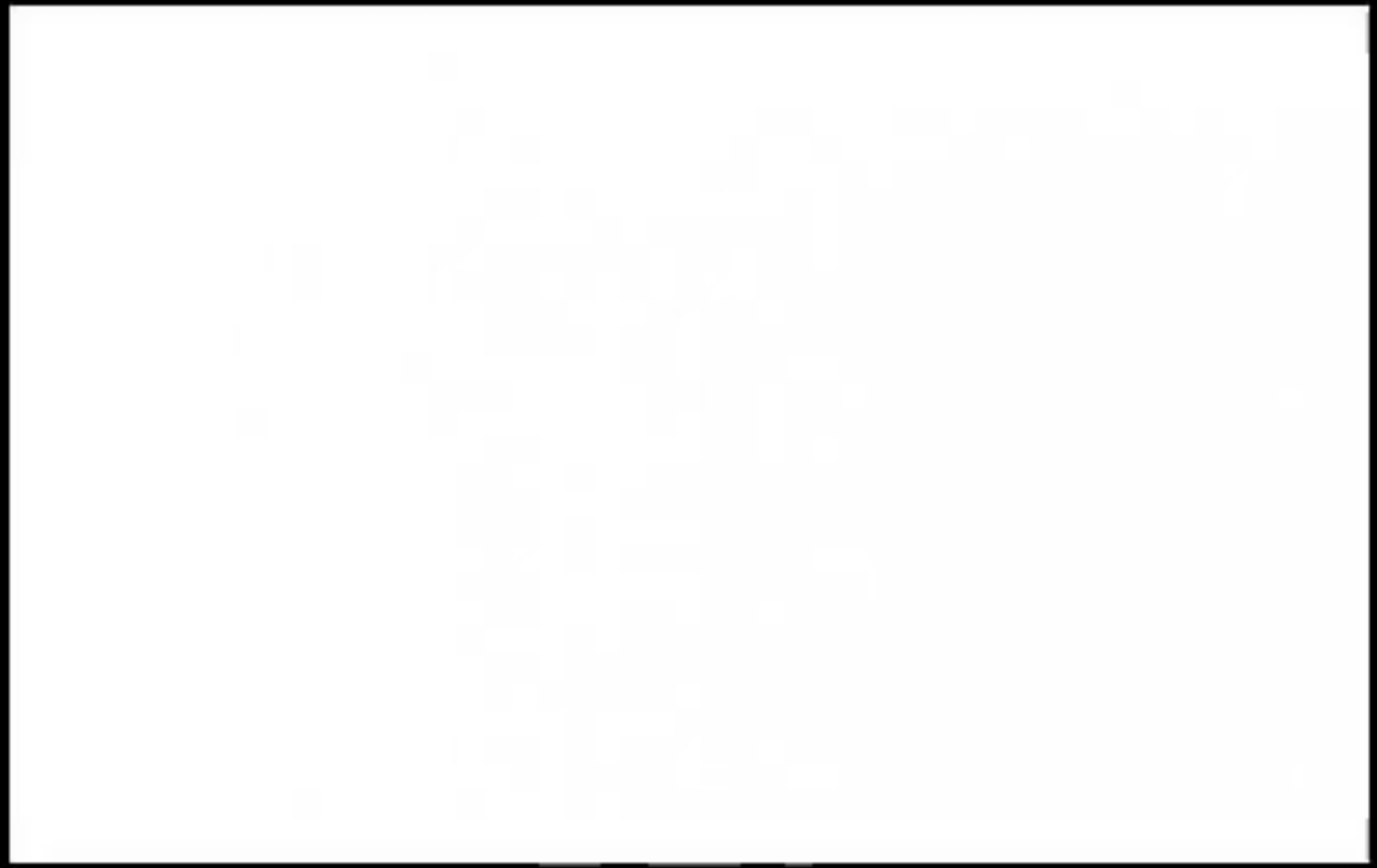
Requests

Bytes

ost.ch

0.0

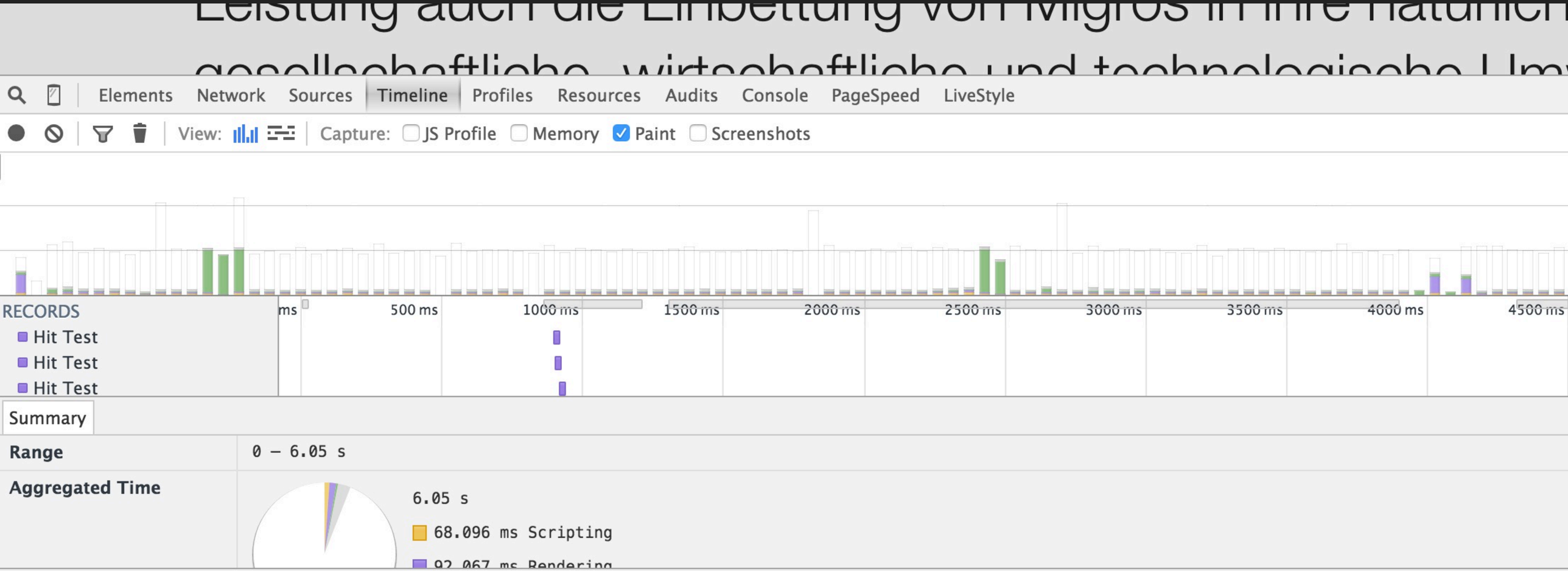
www.netflix.com/ch/



0.0

DEV TOOLS ARE YOUR FRIEND

TIMELINE & FRAMES - 60FPS!

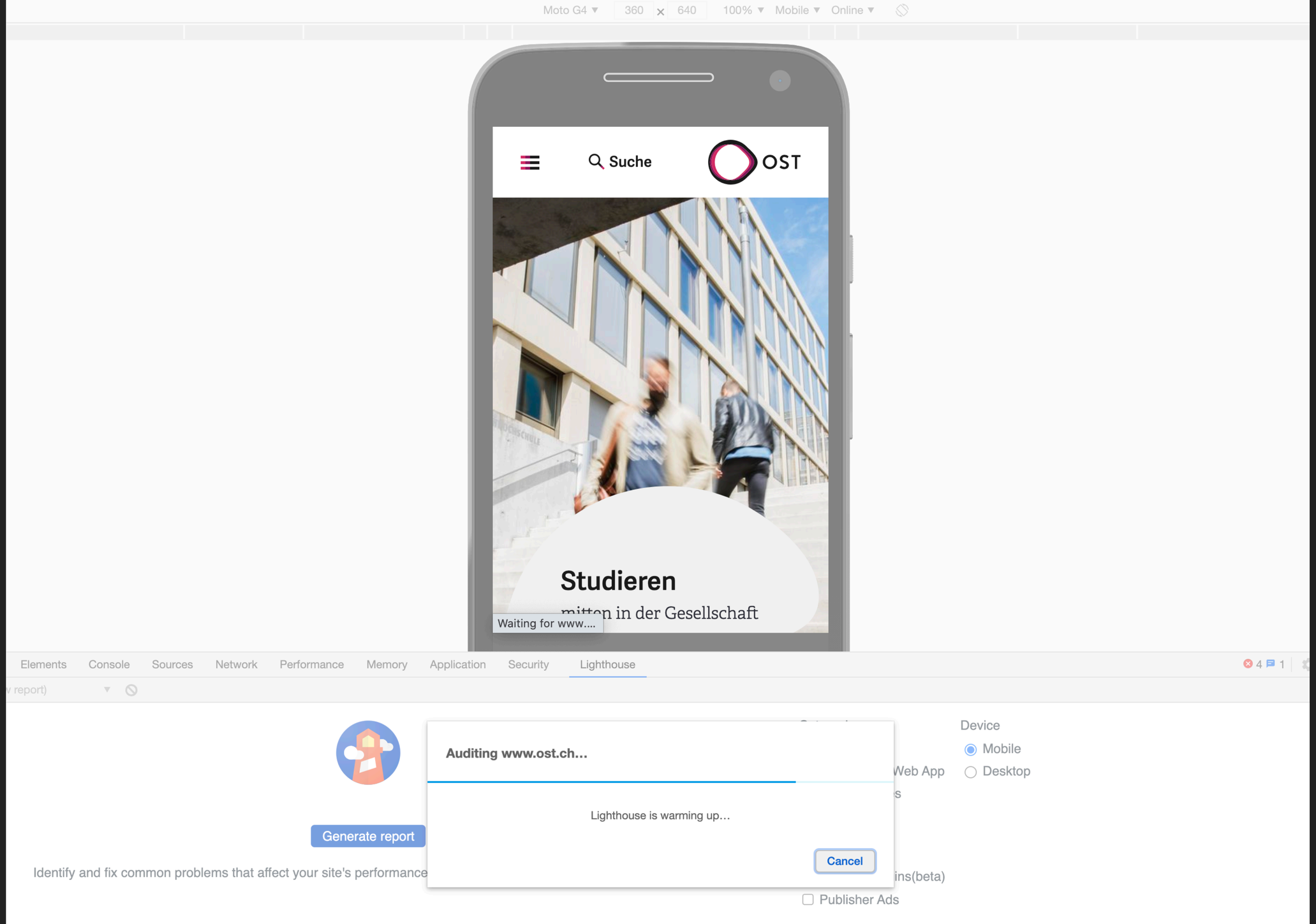


LIGHTHOUSE

HTTPS://CHROME.GOOGLE.COM/WEBSTORE/DETAIL/LIGHTHOUSE/

RUN IN INCOGNITO MODE

HTTPS://CHROME.GOOGLE.COM/WEBSTORE/DETAIL/LIGHTHOUSE/


Moto G4
360 × 640
100%
Mobile
Online
Suche
OST
Studieren
mitten in der Gesellschaft
Waiting for www....
Elements
Console
Sources
Network
Performance
Memory
Application
Security
Lighthouse
Auditing www.ost.ch...
Lighthouse is warming up...
Cancel
Generate report
Identify and fix common problems that affect your site's performance
Device
Mobile
Desktop
Web App
Publisher Ads

27

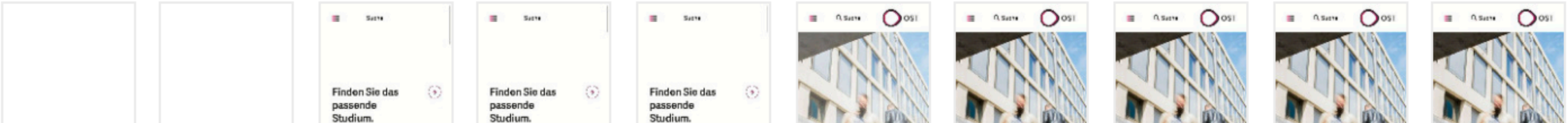
Performance

Metrics

First Contentful Paint	1.7 s	Time to Interactive	12.4 s
Speed Index	6.3 s	Total Blocking Time	1,240 ms
Largest Contentful Paint	11.5 s	Cumulative Layout Shift	0.525

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

View Original Trace



27

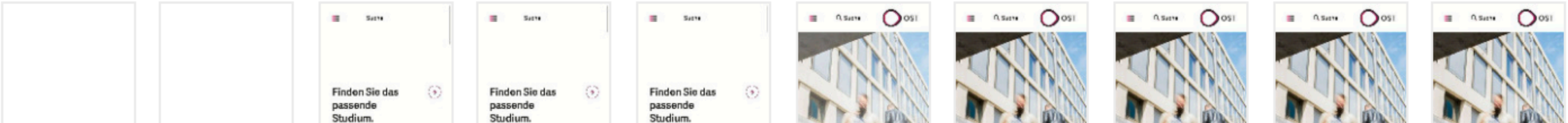
Performance

Metrics

First Contentful Paint	1.7 s	Time to Interactive	12.4 s
Speed Index	6.3 s	Total Blocking Time	1,240 ms
Largest Contentful Paint	11.5 s	Cumulative Layout Shift	0.525

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

View Original Trace



USE 3G OR EDGE AND TEST AGAIN

> 80 / 100

GOOGLE LIGHT HOUSE

COMMON BOTTLENECKS

CSS & JAVASCRIPT

SCROLL OR RESIZE EVENTS?-> THROTTLE / DEBOUNCE

CSS SHADOWS

POSITION CHANGING ON SCROLL (REPAINT)

TOO MANY DOM CHANGES

EXPENSIVE SELECTORS

REPOSITION WITH CSS3

TRANSFORM 3D

NO REPAINT!

60 FPS

DISABLE HOVER TRIGGER ON SCROLL

HTTPS://WWW.THECSSNINJA.COM/JAVASCRIPT/POINTER-EVENTS-60FPS

OK. MY SITE IS FAST.
HOW CAN I MAKE MY SITE EVEN FASTER?

SERVER SIDE

CDN

CDN

DISTRIBUTED SERVERS

+ HIGH AVAILABILITY

+ PERFORMANCE

- DNS CHANGES NEEDED

CDN PROVIDER

KEYCDN.COM

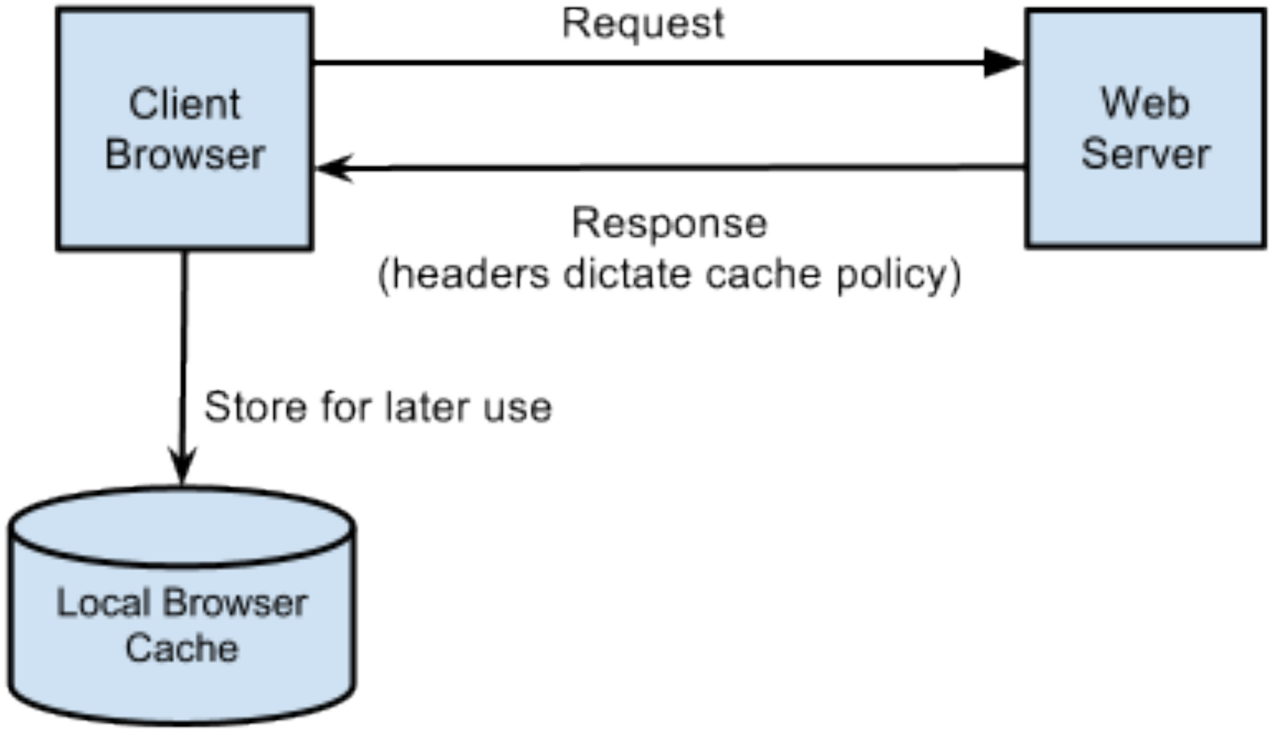
CLOUDFLARE.COM

MAXCDN.COM

CACHE

DON’T DELIVER STUFF THAT DIDN’T CHANGE

CACHE


Request
Client Browser
Web Server
Response
(headers dictate cache policy)
Store for later use
Local Browser Cache

SET HTTP CACHE HEADERS

COOL TOOLS

PERF.ROCKS

PERF ROCKS

Articles Tools People Talks Videos Podcasts Books

Tools

Analysis, optimization and monitoring tools including Grunt, Gulp and Broccoli plugins.

All Node Grunt Gulp Broccoli

Size Limit

Size Limit is a tool to prevent JavaScript libraries bloat. With it, you know exactly for how many kilobytes your JS library increases the user bundle.

Website

Lozad

Advanced performant Lazy Loader using Intersection Observer API.

Website

Fetch Inject

A fetching async loader and DOM injection sequencer for performance-minded webapps.

Website

pwmetrics

CLI tool and lib to gather performance metrics via Lighthouse. Progressive web metrics at your fingertipz.

Website

pageAccelerator

mobile-friendly

Web Performance Checklist

optimize-js

SITESPEED.IO / MONITORING

GOOGLE'S AMP

HTTPS://WWW.AMPPROJECT.ORG/LEARN/ABOUT-AMP/

PWA - PROGRESSIVE WEB APP

NEWEST KIDS ON THE BLOCK

BACK TO STATIC PAGES

SERVICE WORKERS

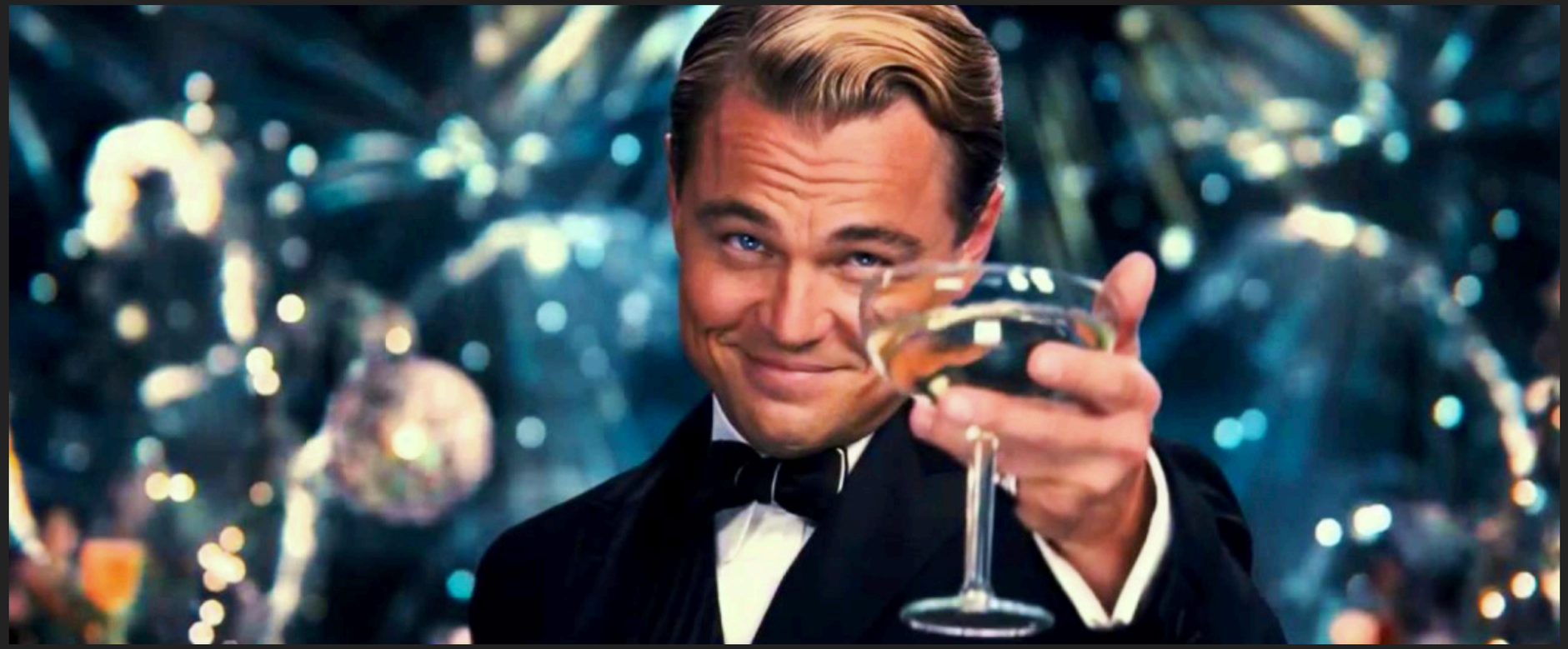
HACK YOUR OWN PAGE

¯_(ツ)_/¯

¯\(ツ)/¯

...BUT I HAVE REACT AND EVERYTHING IS DIFFERENT.

GATSBY JS



NEXT.JS

REACT SPECIFIC

REACT. MEMOIZING

WHY DID YOU RENDER?

HTTPS://GITHUB.COM/WELLDONE-SOFTWARE/WHY-DID-YOU-RENDER

WEB PACK BUNDLE SIZE ANALIZER

```
const BundleAnalyzerPlugin = require('webpack-bundle-analyzer').BundleAnaly

module.exports = {
  plugins: [
    new BundleAnalyzerPlugin()
  ]
}
```

It will create an interactive treemap visualization of the contents of all your bundles.

HTTPS://DEVELOPERS.GOOGLE.COM/WEB/FUNDAMENTALS/PERFORMANCE/OPTIMIZING-